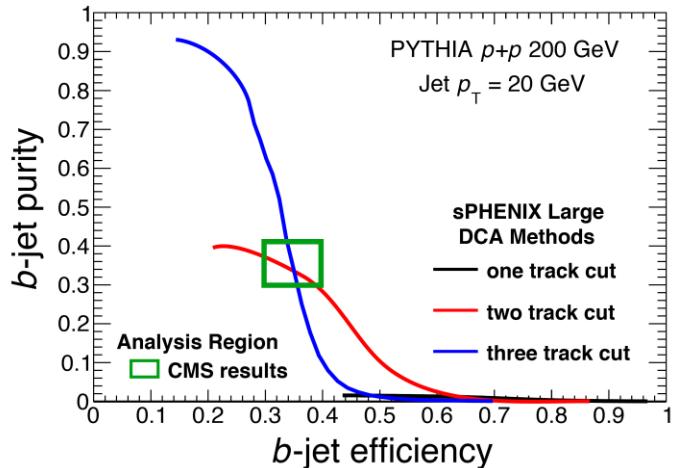


HF topical group plans for tracker review

Mike McCumber (LANL)
Jin Huang (BNL)

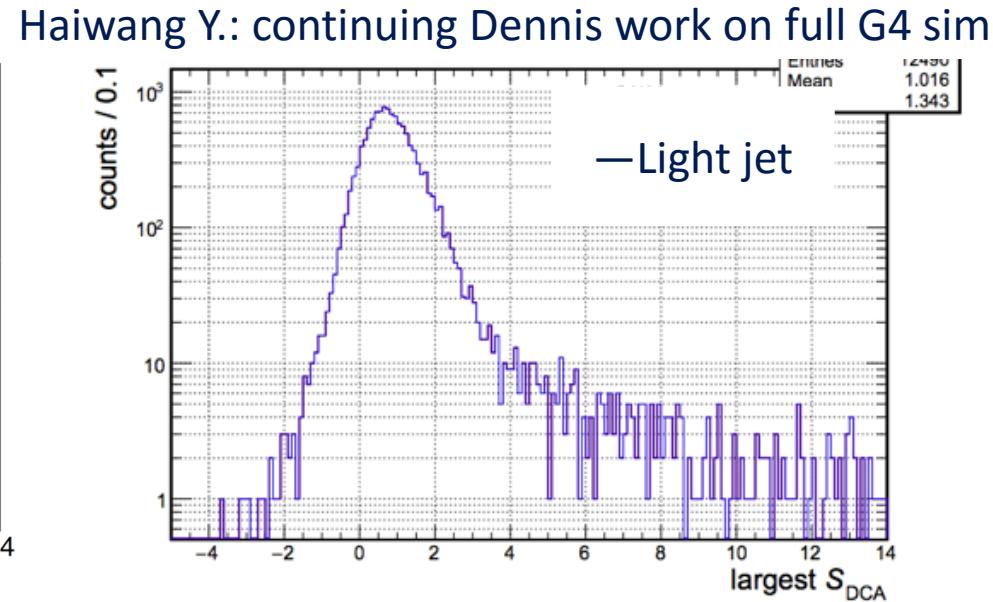
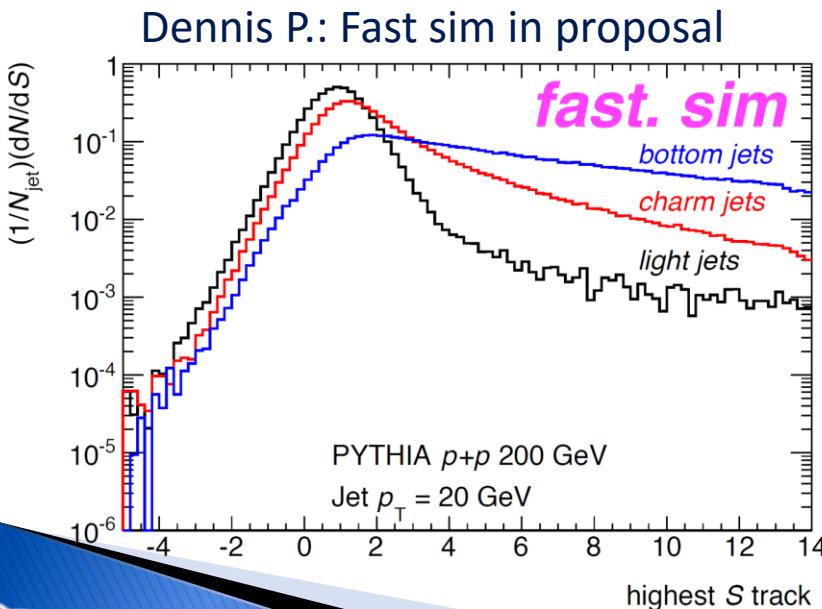
Overview

- ▶ Target B-jet tagging performance plots
 - High DCA track counting : Establishing G4-based procedure beyond fast sim.
 - Secondary vertex: Developing RAVE based secondary vertex finder.
 - Reevaluate tagging in central Au+Au embedded events and pile up
 - Depending on p-p analysis and tracking software progress
- ▶ Unifying truth definition and jet sample generations
 - Based on Dennis' work defining a truth tagging module run on MB events to synchronize B-jet definition and yield between analyzers
 - Two options provided in tagging truth jet by matching B-quark in jet (CMS definition) or matching B-hadron in jet (proposal definition)
 - Available on GitHub:
<https://github.com/sPHENIX-Collaboration/analysis/tree/master/HF-Jet/TruthGeneration>



B-jet tagging – High DCA track counting

- ▶ Recent progress
 - Dennis implemented tagging in full Geant4 simulation, under testing
 - Haiwang followed up the procedure under Dennis' guidance
- ▶ Next
 - Verify the Geant4-based tracking procedure
 - Produce purity VS efficiency plots



B-jet tagging – Secondary vertex

▶ Recent progress

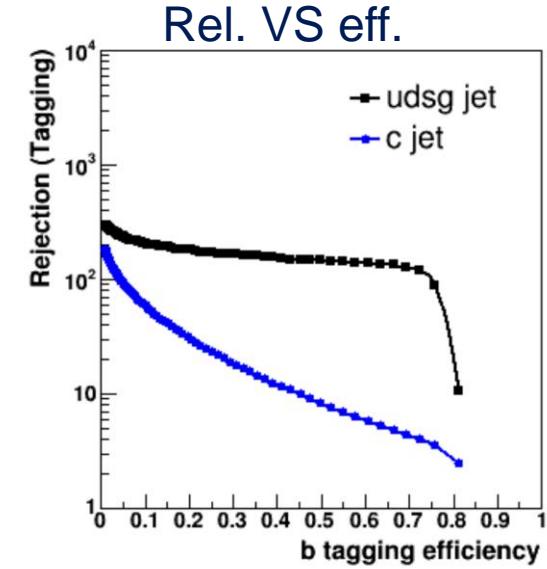
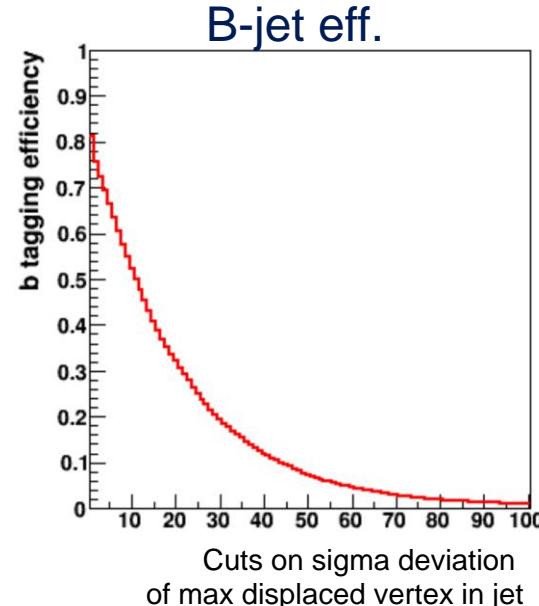
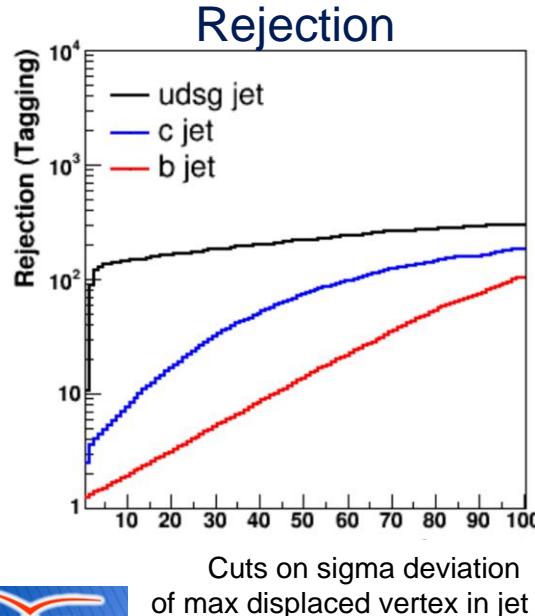
- Haiwang developed new Kalman filter (GenFit2) with vertex finder integration (RAVE)
- Sanghoon implemented Secondary vertex finder in jet
- Rejection based on cut on the significance of most deviated vertex in jet



▶ Plan next:

- Purity results plots and test on Reference tracker and

p+p @ 200 GeV Pythia8, **7layer MAPS** → sPHENIX Geant4 → RAVE



From Sanghoon's talk <https://indico.bnl.gov/conferenceDisplay.py?confId=1923>

From previous meetings



High priority longer-term tasks

- ▶ Goal: realistic study of HF jet performance in sPHENIX simulation and reconstruction.
- ▶ Target time scale: tracking review
- ▶ High priority development tasks (help wanted):
 - Realistic implementation in Geant4
 - Tony F./Gaku M./Chris P., lots of progress
 - Generalized Kalman filter
 - Haiwang Y./Chris P., close to completion
 - Multi-vertexing/B-tagging via secondary vertexing in jet
 - Sanghoon L./Haiwang Y.: exploring RAVE option
 - B-jet tagging: Track Counting
 - Dennis P.: lots of progress in past weeks
 - B-jet tagging: Soft Lepton Tagging
 - Jin H. (+ Help)
 - B-jet tagging: B-Meson Tagging
 - Volunteer needed!